

SOME GROWTH CHANGES IN THE STONE CRAB,  
*MENIPPE MERCENARIA* (SAY)<sup>1</sup>

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Changes in body form with growth are well-known in decapod crustaceans. Among those noted are a shifting of the position of the orbits, sexual differentiation of the brachyuran abdomen, and disproportional growth of appendages. Teissier (1960) summarized some aspects of relative growth, and gave examples of this phenomenon in various crustaceans.

In the Brachyura, particularly in the mud crabs, Family Xanthidae, body proportions are used as generic and specific characters. These proportions are relatively constant in mature individuals, and, in many species, are essential for identification. The shape of the juvenile is often quite different from that of the adult, giving rise to difficulties in identification. Young of many species of xanthids have not been described, and, unless series are available, are often difficult to properly identify.

The stone crab, *Menippe mercenaria* (Say), is a common inhabitant of inshore waters from North Carolina to Mexico (Rathbun, 1930). The narrow frontal region is the most characteristic feature of the adult stone crab. A marked difference in the relative width of the fronto-orbital region was noted in a series of juvenile *M. mercenaria* collected in the northern part of Florida Bay during a study of the ecology of Florida Bay estuaries supported by the Florida State Board of Conservation. The following observations were made on a series of *M. mercenaria* from South Florida, most of which were collected in the above-mentioned area. All of the material is deposited in the collections of The Marine Laboratory, University of Miami.

In mature specimens of *M. mercenaria*, the fronto-orbital width is less than half the carapace width. In the juveniles, the orbits are widely separated, and consequently the fronto-orbital width is much greater in relation to the width of the carapace. The transition zone between the juvenile and adult carapace shape is between 20 to 30 mm. carapace length.

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<sup>1</sup> Contribution No. 294 from The Marine Laboratory, University of Miami, Miami, Florida.

Changes in fronto-orbital width with increasing size are summarized in Table 1 and shown in Figure 1.

TABLE 1  
MEASUREMENTS OF *MENIPPE MERCENARIA*, WITH THE FRONTO-ORBITAL WIDTH EXPRESSED AS A PERCENTAGE OF CARAPACE WIDTH.

	CL	CW	FOW	FOW, as % CW
♂ ♂ -----	17.1	24.0	13.8	57.5
	12.0	16.4	10.4	63.4
	9.9	14.1	9.1	64.5
	6.9	9.4	6.8	72.3
♀ ♀ -----	62.8	91.2	36.7	40.2
	22.3	32.1	16.9	52.6
	10.6	14.6	9.5	65.1
	8.0	11.1	7.5	67.6
	6.7	9.2	6.7	72.8
Sex not determined -----	5.9	8.3	5.8	69.9
	5.1	7.0	5.4	77.1
	4.9	6.8	5.1	75.0

The characteristic shape of the frontal lobes in the adult crab is not evident in specimens smaller than 20 mm. carapace length. Under 14 mm. carapace length, the lobes are only slightly sinuate.

Stridulation ridges are not evident in specimens smaller than 15 mm. carapace length. Although these ridges are well developed in adult *M. mercenaria*, stridulating has not been observed in this species (Guinot-Dumortier and Dumortier, 1960).

The juvenile stone crab, then, is in the process of gradual adoption of adult characters during the time of its growth from 14 to 30 mm. in carapace length.

*Habitat.* Hay and Shore (1918) reported that in North Carolina juvenile *M. mercenaria* were found in deeper channels where they lived under shell fragments. In northwest Florida, *Menippe* apparently prefers turtle grass (*Thalassia testudinum*) flats (Wass, *op. cit.*) Florida Bay juveniles are most often found on the hard bottom of tidal channels rather than in the *Thalassia* flats, which in this area

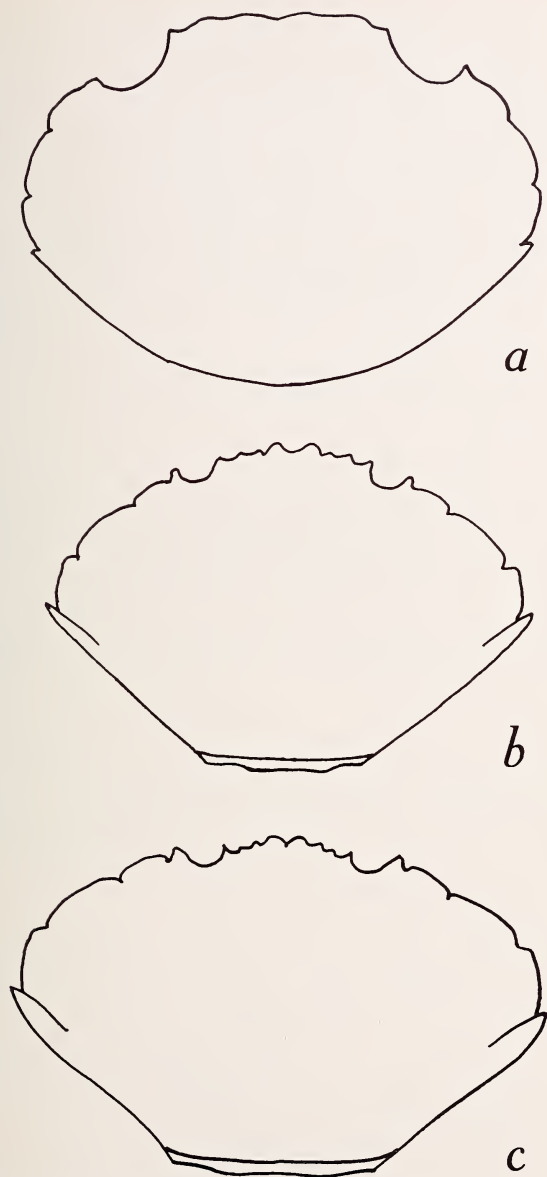


Figure 1. Outline sketches of the carapace of *Menippe mercenaria*, showing the change in fronto-orbital width with increasing size. (a.) ♀, C.W. 7.0 mm.; (b.) ♀, C.W. 37.6 mm.; (c.) ♀, C.W. 91.2 mm. a, b, and c not magnified to same scale.

are heavily silted. Juveniles but not adults are readily trawled in Florida Bay suggesting that the young stages do not form permanent burrows as do the adults. The adults support a restricted trap fishery in deeper channels west and north of Florida Bay proper.

Juveniles, under 8 mm. carapace length, were collected in Florida Bay from October through April, indicating an extended spawning season in this area. Neither juveniles nor adults were collected in salinities less than 31 o/oo during the three-year survey.

*Color.* Both Hay and Shore, and Wass remarked on the dark color of the carapace in the juveniles. Florida Bay specimens were predominantly black or deep maroon with contrasting dots of lighter color scattered irregularly on the carapace. The legs of the juveniles were conspicuously banded with red and cream, the lighter color on the joints.

*Remarks.* Wass (1955) noted the superficial resemblance of *M. mercenaria*, *Panopeus herbsti* H. Milne-Ewards, and *Eurytium limosum* (Say), and pointed out that the habitat of the latter two species did not overlap with that of the former. However, as the ranges of the three species overlap, and as all three may be found in collections lacking habitat information, the following notes on external appearance are given as an aid to the separation of the species.

*E. limosum* can readily be distinguished from *M. mercenaria* by the following characters. The carapace of *Eurytium* is much broader than long and very convex anteroposteriorly, and the anterior margin is flattened, not rounded in general appearance. The frontal lobes are smooth, not bilobed, and the lateral teeth are sharply set off. The fingers of the chelipeds are light in color, not dark as in *Menippe* and *P. herbsti*.

*P. herbsti* has a carapace intermediate in shape between that of the other two species. The carapace is not nearly as wide in relation to length as in *Eurytium*, which it resembles in the flatness of the front. The lateral teeth of the carapace are sharply set off, and the transverse ridges on the carapace, characteristic of the genus, are lacking in the other two species.

*Summary.* The juveniles of the stone crab, *Menippe mercenaria*, differ from the adults in several characteristics. The most prominent difference is in the relative position of the orbits, which are far apart in the juvenile, close together in the adult. Small specimens do not show subdivisions of the submedian frontal lobes, and

the stridulating organ on the palm, characteristic of adults, is not visible in very small specimens. The lateral teeth on the carapace are smoother and more rounded in the juvenile. The young are usually darker in color than the adults, and, unlike the latter, do not form permanent burrows.

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